Ann. Natal Mus. Vol. 24(2) Pages 465–482 Pietermaritzburg October, 1981

A review of Diopsina Curran, 1928 (Diptera: Diopsidae), with a note on Cyrtodiopsis

by

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SYNOPSIS

The genus *Diopsina* Curran, 1928 is redescribed. Its important characters are discussed and a key to the species is given. Two new species are described; *D. draconigena* from South Africa and Lesotho and *D. kwaipai* from Malawi. The other *Diopsina* species are reviewed. The genus *Cyrtodiopsis* Frey is briefly discussed and the differences between *Diopsina* and *Cyrtodiopsis* indicated.

INTRODUCTION

The genus *Diopsina* was originally described by Curran (1928) from a single male specimen from Faradje, northern Zaïre. Until recently *D. ferruginea* was considered to be the sole representative of this genus. Then Feijen (1978) referred *Teleopsis nitida* Adams, 1903 and *Cyrtodiopsis africana* Shillito, 1940 to the genus Diopsina and described *D. schulteni* as a new species. The transfer of *nitida* to the genus *Diopsina* was confirmed by Cogan & Shillito (1980). In 1955 Seguy introduced *Phryxodiopsis* as a new African genus of Diopsidae. Feijen placed *Phryxodiopsis kaeleana* as a synonym of *D. nitida*, whereas Cogan & Shillito mentioned it as a possible synonym of *D. ferruginea*.

This paper deals with *Diopsina* specimens belonging to the Natal Museum as well as with my own material from Malawi. Two new species are described: *D. draconigena* from South Africa and Lesotho and *D. kwaipai* from Malawi. *D. draconigena* is the first Diopsid known to have a brachypterous form. All the other *Diopsina* are reviewed and a key is given to distinguish the species. Special attention is given to genitalia as this is the only way of ending the existing confusion in diopsid taxonomy. Some species of the genus *Cyrtodiopsis* (from the Leyden and Natal Museums) were also studied in order to make a comparison with *Diopsina* possible.

Important characters in *Diopsina*

Size: *D. africana* and *kwaipai* are large species (5 mm), *nitida* is medium sized (4,5 mm) while *schulteni* and *draconigena* are small species (< 4 mm).

Colour: a clear distinction exists between the more yellowish red species (*ferruginea*, *africana* and *schulteni*) and the blackish brown species (*nitida*, *kaeleana*, *kwaipai* and *draconigena*).

Facial teeth: present in *ferruginea*, *africana*, *kwaipai*, *nitida* and *kaeleana*, absent in *draconigena* and *schulteni*. The uselessness of this character in distinguishing genera should by now be well known (see Shillito, 1971).

Frons: the region between the ocellar tubercle and arcuate groove is sculptured in a specific way, which is rather difficult to describe and has to be illustrated. The two depressions in front of the tubercle appears to be common to all species.

Thorax: except for the scutellum and some small spots on the collar the thorax is glossy dorsally (except for some males of *nitida*); the scutellum is wholly pollinose dorsally in *draconigena* and *nitida* (not mentioned in Adams' description), but only the anterior section is pollinose in *schulteni* and *kwaipai*.

Scutellar spines: the size varies from large (3 × scutellum—*kwaipai*) to small (2 × scutellum—*draconigena*) to very small (1,5 × scutellum—*schulteni*). The basic pattern of a pale proximal section, dark central section and paler apical section is present in all *Diopsina*, but specific variation occurs in the relative sizes of the sections.

Wing: the basic pattern of 3 subapical spots, 2 central spots and 2 more proximal spots occurs in all *Diopsina*; the apical section is paler than the rest of the wing, except in *ferruginea*; the relative size of the paler apical section (measured from the middle of the subapical spot to the wingtip) ranges from one fifth of the wing (*schulteni*, *nitida*) to one sixth (*draconigena*, *kwaipai*) to one seventh (*africana*) to one eighth in *ferruginea* (but in this species the section is not paler). Some variation also occurs in the shape of the spots, but as some intraspecific variation occurs this does not seem to be very useful. An exception is the shape of the most proximal anterior spot which continues halfway into the second basal cell in *draconigena*, *kwaipai*, *schulteni* and *africana*, but does not cross the fourth vein in *nitida* and perhaps also in *ferruginea*.

Legs: the F1 has two small rows of tubercles varying per row from 5 (*africana*) to 6 (*kwaipai*) to 7–8 (*nitida*, *draconigena*) to 10 (*schulteni* and *Diopsina* sp.). Seguy mentions 6–8 for *kaeleana*. Some care has to be taken with this character as some intraspecific variation occurs (between the four rows of one specimen variation might also exist).

Abdomen: in all *Diopsina* with the same strongly clavate form; the distribution of the pollinosity shows interspecific variation, the first small tergite is in all species pollinose, the second tergite is anteriorly pollinose in *nitida* and wholly pollinose in *kwaipai*, the posterior edges of tergite 2 and 3 are pollinose in *draconigena* and *nitida*, the posterior edge of tergite 3 is also pollinose in *kwaipai*. *D. nitida* has two pollinose spots on the third tergite while *Diopsina* sp. shows the same spots and a large pollinose area around the border of both 3rd and 4th tergites. The apical edges of the sternites usually show pollinose bands and Curran mentions whitish vitta on the 3rd and 4th sternites of *ferruginea*.

Genitalia: interspecific variation is relatively small (compared with, for example, the large variation found in *Diopsis*). Interspecific variation occurs in the distribution of microchaetae and the number of long hairs on the periandrium, shape of the surstyli, distribution of hairs on the surstyli and shape and hairs of the cerci. The aedeagal and ejaculatory apodemes are not very useful in distinguishing species, but the aedeagal apodeme is especially typical for the genus. The smooth, slender, curved processus longi is also typical for the genus. In the female useful

characters are: the distribution of microchaetae on the 9th tergite, the number of long hairs on the 10th tergite (two pairs in all species examined so far except for *Diopsina* sp. with one pair), the shape of the subanal plate (triangular in *draconigena* and *kwaipai*, pentagonal in *nitida*) and the form of the three spermathecae (round in *kwaipai* and *nitida*, more egg-shaped in *draconigena*).

Chaetae: as far as chaetotaxonomy is concerned *Diopsina* is a very peculiar genus; showing in fact more variation than was previously known to occur in the whole of the family Diopsidae. All species have a strong IOB and a strong, but shorter, OOB (in *africana* and *kwaipai* the OOB is twice as thick as the IOB). In *draconigena* there is a row of short bristles on the eye stalks and four pairs of bristles around the frons. These bristles might be equivalent to orbital and frontal bristles. On the thorax, *africana*, *kwaipai* and *schulteni*, have only the apical bristles on the scutellar spines. All other species have, except for the apical bristles, one pair of SA and one pair of IA. *D. ferruginea* has a pair of notopleural (= pre-sutural?) bristles. *D. nitida* and *draconigena* have one to two pairs of DC bristles and the latter species may sometimes even possess a pair of acrostichal bristles. *D. ferruginea* has one pair of discal bristles on the scutellum while *nitida* and *draconigena* have one or two pairs of discal bristles. The hairs along the scutellar spines are less bristle-like and more numerous in *africana* and *kwaipai*. *D. draconigena* may even possess bristles on the third tergite. *D. schulteni* is a very bald species, *ferruginea* is also rather bald while the other species are hairy, with *kwaipai* and *africana* being very hairy.

Diopsina Curran, 1928

Diopsina Curran, 1928*a*: 5, type species *Diopsina ferruginea* Curran, 1928.
Phryxodiopsis Seguy, 1955: 1106, type species *Phryxodiopsis kaeleana* Seguy, 1955.

Small to medium sized diopsids with relatively short eye stalks: IOB and OOB strong; no supra-alar spines; scutellum convex, deeper than long with typically curved spines (Fig. 1), central section of spines dark, base and tip much paler; apical bristles present, other thoracic bristles present or absent; F1 moderately incrassate with two small rows with from 5 to 10 tubercles apically; wing without alula, no sixth vein, fifth vein not reaching the margin; wing dark with subapical band of three pale spots, in the centre of the wing one anterior and one posterior spot, at one third from the base also one anterior and one posterior spot; abdomen strongly clavate; periandrium with a typical rounded triangular shape, surstyli non-divided (no clear apophysis), male cerci simple, from not very broad to narrow, processus longi smooth and slender, running in a typical, curved way between the surstyli; tenth tergite of female with one or two pairs of long hairs; three smooth, round to egg-shaped, spermathecae (in Diopsidae only the genus *Diasemopsis* seems to have two spermathecae).

Key to species of *Diopsina*

1. Dorsolateral and discal thoracic bristles absent 2
– Dorsolateral and discal thoracic bristles present 4
2. Small thoracic spines, bald, F1 with rows of 10 tubercles ..... **schulteni**
– Strong thoracic spines, very hairy 3

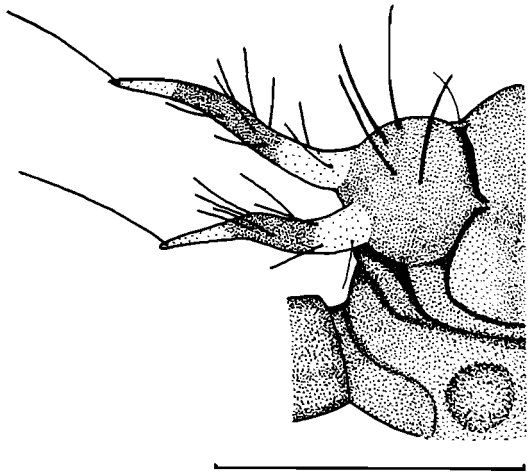

Fig. 1. Scutellum of *Diopsina nitida* ♀ from Bunda, Malawi, showing two pairs of discal bristles and typical *Diopsina* spines. Scale 1 mm.

3. Yellow to reddish brown species, F1 with rows of 5 tubercles ..... **africana**
– Blackish brown species, F1 with rows of 6 tubercles ..... **kwaipai**
4. Reddish ferruginous, 3 pairs of dorsolateral bristles (NP, SA and IA)..... **ferruginea**
– Blackish, 2 pairs of dorsolateral bristles (SA and IA) 5
5. Small facial teeth, two small pollinose spots on third tergite ..... **nitida**
– No facial teeth, no pollinose spots on abdomen, often brachypterous ..... **draconigena**

Diopsina africana (Shillito, 1940)

Cyrtodiopsis africana Shillito, 1940: 160
Diopsina ferruginea; Lindner, 1962: 17
Diopsina africana; Feijen, 1978: 23

Figures: Shillito, 1940, fig. 6, pl. 1, fig. G.

Type: from Nyahasura, Toro, Uganda; in British Museum (Natural History), London.

Distribution: Uganda, Ethiopia, Zaïre, Ivory Coast.

Shillito's description is quite adequate. The apical bristle is not shown in the figure, nor mentioned in the text, but Shillito (pers. comm.) later stated that it had an apical bristle of half the length of the scutellar spine or less. Shillito did not describe the frons of *africana*, but later said that it had two pairs of rather irregular rounded depressions in front and to the side of the ocellar tubercle. There are also two depressions behind the tubercle.

This species is very near to *kwaipai*. When some years ago I briefly compared *kwaipai* with type material of *africana* in the British Museum and with *africana* in the Stuttgart museum, I noted the obvious difference in colour (yellowish red in *africana* as opposed to almost black for *kwaipai*) and the difference in spine

length (the scutellar and pleurotergal spines being smaller in *africana*). Other differences are mentioned under *kwaipai*. The genitalia of *africana* have not yet been described but they are likely to be quite similar to those of *kwaipai*, which has typical *Diopsina* genitalia. The genitalia of *Diopsina* are quite different from those of *Cyrtodiopsis* from Asia (see note on *Cyrtodiopsis*) or the '*Cyrtodiopsis*' from Madagascar. Shillito (pers. comm.) stated that, at the time (1940), he would have preferred to establish a new genus for *africana* instead of including it in *Cyrtodiopsis*. This would certainly have been better, as it could then easily have been subsequently accommodated as a subgenus of *Diopsina* (together with *kwaipai*).

Shillito's (1940) remark that the wings of *africana* 'held flat over the abdomen serve to exaggerate the petiolation' is rather doubtful. This might be true for diopsids of the *Diopsis circularis* group, but certainly not for any *Diopsina*.

Diopsina draconigena sp. n. Figs 2a, 3a, 4a, 4b and 5

Type material: SOUTH AFRICA, *Natal*, 1 ♂ holotype, 4 ♂ 5 ♀ paratypes, Giant's Castle Reserve, Drakensberg, 18–23.IX.1963, B. & P. Stuckenberg. 1 ♂ 1 ♀ paratypes, Pietermaritzburg, 20.XI.1963. 1 ♂ paratype, Gillits, St. Hellier, 7.XII.1978. LESOTHO, 1 ♀ paratype, Roma, 4–13.I.1963. All types are in the Natal Museum (NM 2477), except for two paratypes deposited in the Rijksmuseum van Natuurlijke Historie, Leyden, Holland.

Measurements: mean eyespan 2,3 mm (range 2,1–2,7 mm), mean length of body 3,6 mm (range 3,1–4,1 mm), mean length of wing of brachypterous form (from Giant's Castle Reserve) 1,5 mm (range 1,0–1,9 mm), mean length of wing of

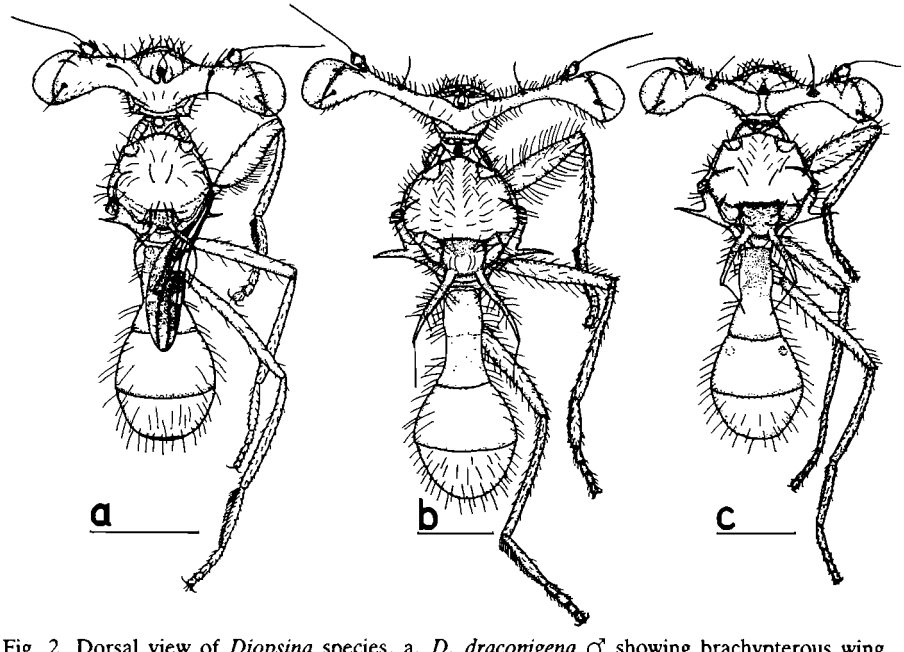

Fig. 2. Dorsal view of *Diopsina* species. a. *D. draconigena* ♂ showing brachypterous wing. b. *D. kwaipai* ♂. c. *D. nitida* ♀ from Bunda, Malawi. Scales 1 mm.

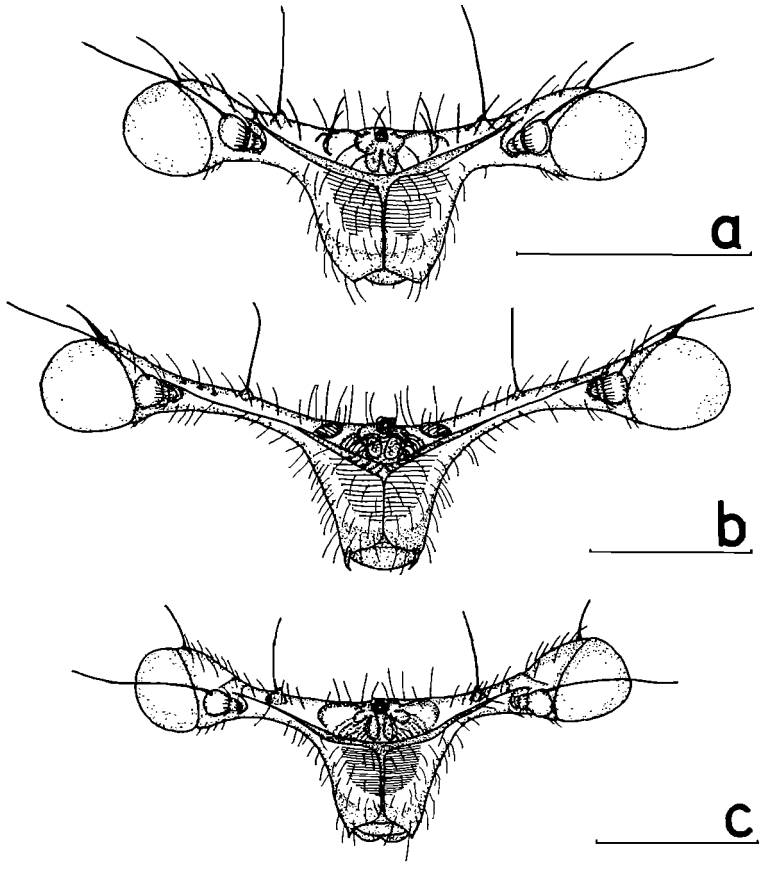

Fig. 3. Anterior view of head of *Diopsina* species. a. *D. draconigena* ♂. b. *D. kwaipai* ♂. c. *D. nitida* ♀ from Bunda, Malawi. Scales 1 mm.

normal form 2,2 mm (range 2,0–2,4 mm), mean length of scutellar spines 0,36 mm (range 0,26–0,50 mm). No sexual differences were found in the various measurements taken. In diopsids the eyespan is usually larger in males. Eyespan and body-length were on average the same in the ten brachypterous and the four 'normal' flies. Apart from the wings, the scutellar spines were also somewhat smaller in the brachypterous flies (0,34 mm against 0,41 mm).

Head: central section shining dark brown, ocellar tubercle black; (pre) frons encircled by tiny ridge, two depressions in front of ocellar tubercle, which continue somewhat around this tubercle; arcuate groove clear, black; face (post frons) paler brown, with tiny horizontal ridges, corners of face rounded, no facial teeth; eyestalks short, strong, same colour as central section except for broad apical ends, which are shining black; IOB long, strong, pointing upward, OOB shorter, both arising from a small tubercle; antennae brown, somewhat pollinose, edge of second segment with row of about ten small bristles, outer ones being larger, arista long, black, subdorsal; eyes dark, somewhat reddish; except for larger IOB and OOB head possesses a number of smaller black bristles, about

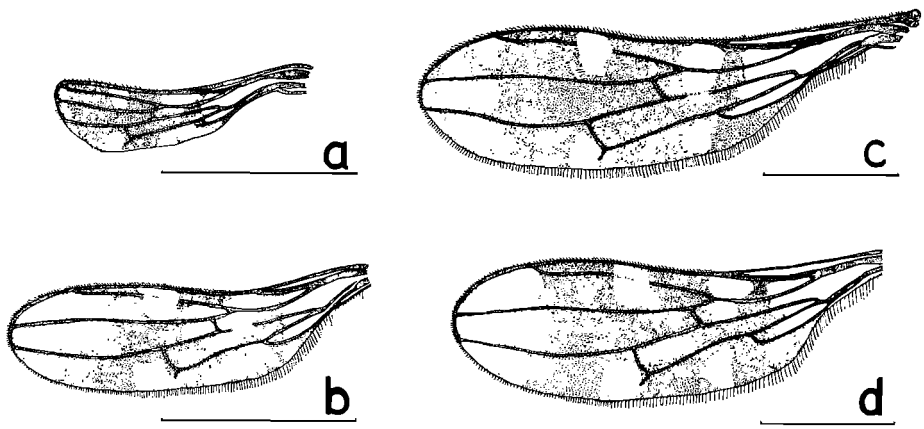

Fig. 4. Wing of *Diopsina* species. a. *D. draconigena* ♀, brachypterous form. b. *D. draconigena* ♂, normal form. c. *D. kwaipai* ♂. d. *D. nitida* ♀ from Bunda, Malawi. Scales 1 mm.

five in a row on each stalk, dorsally of arcuate groove and in direction of OOB, furthermore four pairs on ridge around frons and one pair of small ocellar bristles, in some specimens some bristles around frons and on ocellar tubercle are more hairlike; face covered with long white hairs, also some hairs on stalks and about six long white hairs posteriorly of ocellar tubercle.

Thorax: shining black brown, collar somewhat paler, dorsal section of scutellum pollinose, pleurae glossy except for base of third leg and around base of haltere, around base of wing also somewhat pollinose; pleurotergal spines medium sized, pale brown, pointing laterally; scutellum convex, deeper than long; scutellar spines rather small, 2 × scutellum, proximal third whitish, central section dark brown turning paler brown towards tip, spines turning upward, levelling out at one third from tip, spines diverging at an angle of 90°; spine with 4–6 short bristle-like hairs with small warts, apical bristle as long as spine; thorax with a single pair of supra-alar and intra-alar bristles, one pair of dorsocentral bristles, in some flies there are two pairs of dorsocentrals and in some even a pair of acrostichal bristles; scutellum carries one or two pairs of discal bristles; a number of long white hairs are distributed over thorax.

Wing: in macropterous specimens wing basal quarter hyaline except for base of axillary cell and apical section of anal cell; rest of wing covered with dark microchaetae; spots are covered with fewer and paler microchaetae, except for the proximal anterior spot of which anterior half is hyaline; a vague spot in base of axillary cell; at one third from base an anterior spot in marginal cell, continuing in first basal cell and ending halfway into second basal cell and a posterior spot in third posterior cell; in centre of wing an anterior spot in marginal and submarginal cells, touching third vein, and a posterior spot at base of second posterior cell; apical sixth of wing paler, bordered by three subapical spots in submarginal, first posterior and second posterior cells; a brachypterous wing has about 0,6 of length and 0,5 of width of a normal wing, giving a surface of about 0,3 of a normal wing; pattern of spots is similar; halteres white.

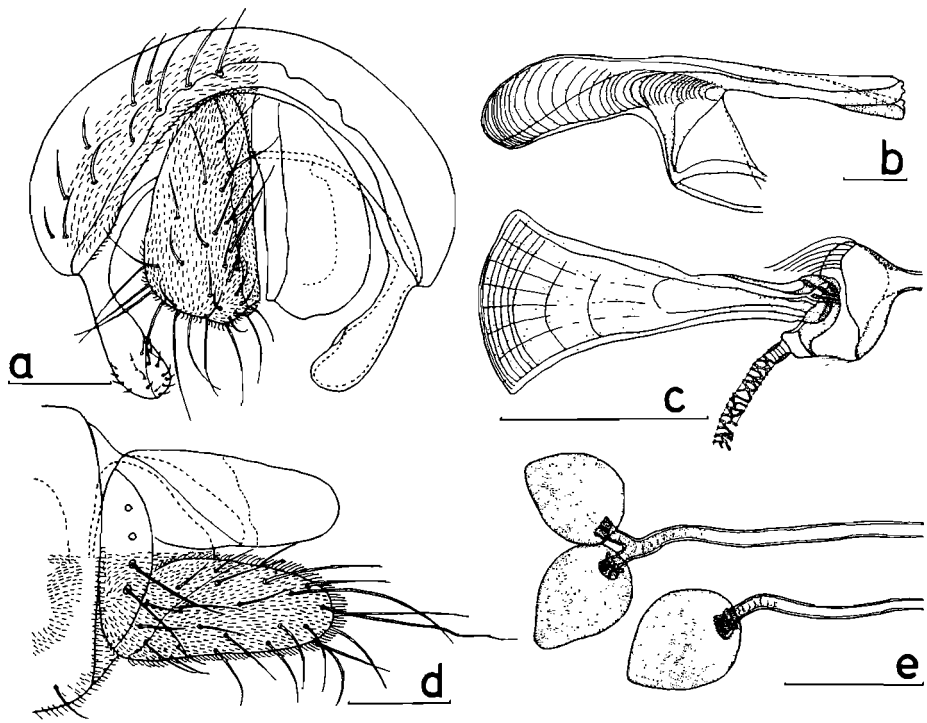

Fig. 5. Genitalia of *Diopsina draconigena*. a. Hypopygium. b. Aedeagal apodeme. c. Ejaculatory apodeme. d. Female cerci. e. Spermathecae. Scales 0,1 mm.

Legs: coxa 1 and trochanter 1 pale brown, femur 1 darker especially towards apical side, tibia 1 and tarsus 1 dark brown; 2nd and 3rd leg more uniformly pale brown with apical part of femora darker; some variation in leg colour occurs, some specimens with uniform pale brown legs; inner side coxae, especially coxa 1, pollinose, also some pollinosity on trochanter and base of femora; femur 1 moderately incrassate with two rows of about 7 or 8 tubercles on apical third, no apical spurs on F2 and F3; ventral side of metatarsi 1 and 3 with white pubescence; femora with long white hairs, tibiae and tarsi with short black hairs.

Abdomen: strongly clavate, segment 1 small slender, apical end of segment 2 extended laterally, segment 3 3 × broader than 1, width of 4 and subsequent segments diminishing in turn; colour shining blackish brown, but apical half of 2 and distal half of tergite 3 shining brown; tergite 1 pollinose except for sides, apical edge of tergites 2 and 3 pollinose; tergite 3 in brachypterous form often with one to three pairs of black bristles, first three tergites with long white hairs laterally, on tergites 4 and 5 also with long white hairs dorsally; sternites shining brown with pollinose edges.

Genitalia: periandrium with about eleven pairs of strong hairs, covered with small hairs along posterior margin; surstyli (telomeres) more or less club-like, with a small bend in middle, at apical end some small bristle-like hairs, remainder bald;

cerci broad, somewhat pointed at apical central edge, covered with small hairs and a number of long hairs; processus longi slender and curved; aedeagal apodeme of characteristic *Diopsina* type; ejaculatory apodeme fan shaped. Tergite 9 of ♀ has bald patches, segment 10 carries two pairs of bristle-like hairs, cerci relatively broad, subanal plate triangular with rounded corners; spermathecae somewhat egg-shaped, rounded on one side and pointed on other side.

Habitat: the flies from Giant's Castle Reserve and Lesotho were all collected in tufts of grass on banks of small streams at an altitude of 1 800 m. Those from Pietermaritzburg were collected near a river bank.

At present *D. draconigena* is the only diopsid known in which a brachypterous form occurs. The brachypterous individuals were all from a high altitude, but the 'normal' specimen from Lesotho was collected at the same high altitude. In general all species of *Diopsina* are 'crawlers' rather than 'fliers' and it might be that *draconigena* has taken this way of life a step further.

D. draconigena is characterised by its small, compact build, dark colour, absence of facial teeth, the presence of small bristles on the eyestalks and around the frons, the presence of 1 pair of SA, 1 pair of LA, 1 or 2 pairs of DC, (sometimes even a pair of acrostichal bristles) and 1 or 2 pairs of discal bristles, rows with 7 to 8 tubercles on the F1, abdomen without pollinose spots, club-like bald surstyli and egg-shaped spermathecae. The occurrence of a brachypterous form is unique to this species. Its nearest known relative is probably *nitida*.

Diopsina ferruginea Curran, 1928

Diopsina ferruginea Curran, 1928*a*: 5; Curran, 1928*b*: 183; nec Shillito, 1940: 153, 155; (in part) van Bruggen, 1961: 429; nec Lindner, 1962: 17; Feijen, 1978: 22.

Figures: Curran, 1928*b*, fig. 2; van Bruggen, 1961, fig. 17 and 18 nec 19; nec Shillito, 1940, fig. 4D.

Type: ZAÏRE, Faradje; in American Museum of Natural History, New York.

Distribution: Zaïre, South Africa.

As *Diopsina* remained monotypical for 50 years different species were regularly attributed to its genotype *Diopsina ferruginea*. Although Curran's description is lacking in various parts it mentions one character not found in any other *Diopsina*: the presence of a pair of notopleural bristles. It also has a pair of SA and IA bristles, which are found in several other *Diopsina*. Curran's figure clearly shows these three dorsolateral bristles. Other important characteristics are: yellowish to reddish ferruginous colour, presence of FT, one pair of discal bristles, long pleurotergal spines, median whitish vitta on abdominal sternites 3 and 4 and pile of hair wholly sparse. Curran's figure shows the proximal anterior spot of the wing as not continuing into the second basal cell. The apical seventh of the wing is not shown to be paler than the rest. On the presence of DC some confusion exists. Shillito (pers. comm.) stated that he saw them in undamaged specimens, but he may have been examining a different species (*nitida ?*). *Hennig* (1965) stated that he could not find a DC nor an SA in *Diopsina* (which species he investigated is not known). He further stated that as the DC is absent in *Centrioncus*, their occurrence in the relatively 'abgeleiteten' genus *Diopsina*

would be quite strange. However, a DC definitely occurs in various *Diopsina*.

Feijen (1978) discussed the possibility of the *D. ferruginea* material studied by van Bruggen (1961) as belonging to *D. nitida*. I have now examined the two Zambian specimens he mentioned and illustrated (abdomen—fig. 19). These had genitalia quite different from those he illustrated in fig. 18 and clearly they belong to *D. nitida* (see under *nitida*). I briefly examined, some years ago, in the British Museum the specimens from Natal and the Orange Free State which van Bruggen illustrated (wing and hypopygium). I noted their yellowish brown colour and, as compared with *nitida* from Malawi, short eyestalks and straighter scutellar spines. The wing shown by van Bruggen shows an anterior spot in the basal third continuing into the second basal cell, which is not shown in Curran's drawing. Both show the apical section of the wing as equal in colour to the rest of the wing. The hypopygium illustrated by van Bruggen shows fan-like surstyli, which are definitely different from other known *Diopsina* surstyli. For the moment I consider van Bruggen's BM material (illustrated in his fig. 17 and 18) as belonging to *D. ferruginea*, but the possibility that it belongs to an as yet undescribed species still exists.

Cogan & Shillito (1980) indicated *D. kaeleana* as a possible synonym of *ferruginea*, but this is not correct.

Diopsina kaeleana (Séguy, 1955)

Phryxodiopsis kaeleana Séguy, 1955: 1106
Diopsina nitida; Feijen, 1978: 23
Diopsina kaeleana; Cogan & Shillito, 1980: 585

Type: CAMEROON, Kaélé; in Muséum National d'Histoire Naturelle, Paris.

Distribution: Cameroon, Senegal.

Feijen (1978) listed *kaeleana* as a synonym of *nitida*. As more *nitida*-like *Diopsina* now appear to occur in West-Africa this synonymy has to be withdrawn till more is known about *kaeleana*, especially its genital morphology and the pattern of pollinosity on its abdomen. In describing the genitalia Séguy only said 'forceps à branches quadrangulajres munies de cils blanchâtres', which is clearly not enough for recognition. Except for the scutellar bristles, Séguy mentioned as thoracic bristles 'Une soie dorsocentrale, une soie postalaire de chaque côte, noires'. There has been some confusion on the naming of thoracic bristles in Diopsidae (see also Hennig, 1965) but he certainly meant, what in this paper (following Shillito 1940 and Curran 1928), have been called IA and SA bristles. Real dorsocentral bristles as found in *draconigena* are certainly not 'de côte'.

Diopsina kwaipai sp. n. Figs 2b, 3b, 4c and 6

Type material: MALAWI, Zomba, 1 ♂ holotype, 20 ♂ and 18 ♀ paratypes, from a field near the Mponda stream, VII–VIII.1975, H. R. Feijen. It is my pleasure to name this species after Mr Hermes Kwaipa, who was the first to collect it. All types are in the Leyden Museum, except for four paratypes, which are deposited in the Natal Museum (NM 2478).

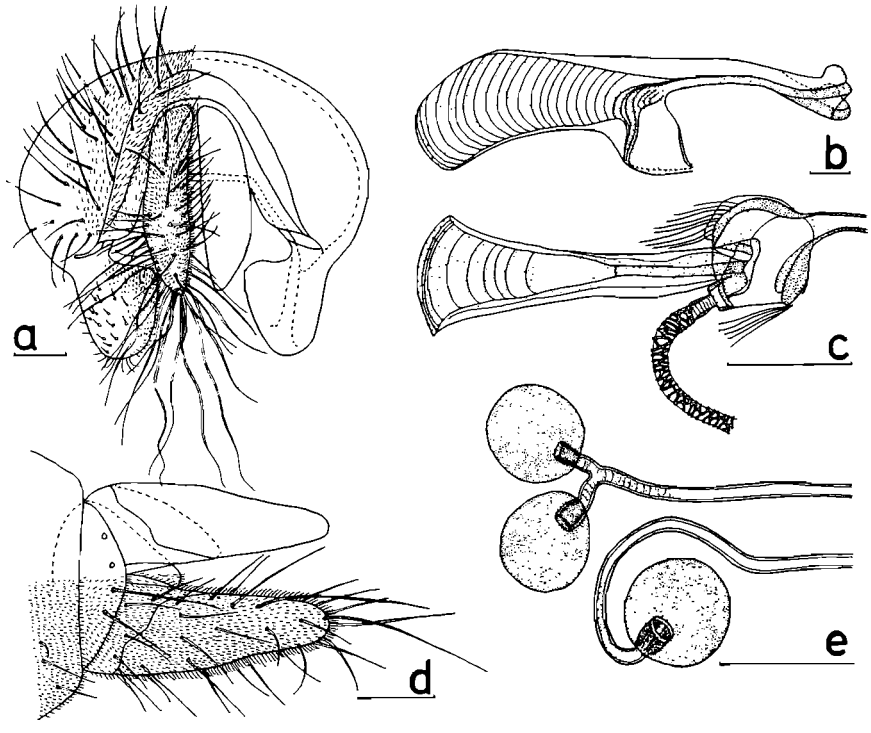

Fig. 6. Genitalia of *Diopsina kwaipai*. a. Hypopygium. b. Aedeagal apodeme. c. Ejaculatory apodeme. d. Female cerci. e. Spermathecae. Scales 0,1 mm.

Measurements: mean eyespan 3,8 mm (range 3,2–4,3 mm), mean length of body 4,9 mm (range 4,0–6,2 mm), mean length of wing 3,6 mm (range 3,2–4,2 mm), mean length of scutellar spine 1,1 mm (range 0,9–1,3 mm). For all variables measured, the means were exactly the same for both sexes. As the same was found in *D. draconigena*, it seems likely that no size differences occur between the sexes in *Diopsina*.

Head: central section shining dark brown, ocellar tubercle black; frons with two clear depressions in front of ocellar tubercle, depressions bordered laterally by an elevated triangular area with vertical ridges, laterally of these areas a smooth depression followed by a strongly elevated area at edge of frons, ornamented with horizontal ridges; arcuate groove black; face brown, elevated dorsal half with fine horizontal ridges, strong facial teeth, pointing forward; eyestalks well developed, same dark colour as central section except for broad apical ends, which are black pollinose; IOB long, strong, OOB twice as thick, about half as long, both arising from a small tubercle; antennae dark brown, segment 2 with about ten strong hairs, segment 3 with white pile, arista long, black, subdorsal; eyes dark, somewhat reddish; stalks and dorsal central section covered with regularly distributed strong black hairs, face and lateral sides of central section with long white hairs with black ones in between.

Thorax: shining black brown, central knob and posterior margin of collar pollinose, some pollinosity on lateral side of collar and around wing base, base of third leg, posterior margin of pleura and anterior dorsal section of scutellum pollinose; pleurotergal spines brown and strong, pointing laterally; scutellum convex, deeper than long; scutellar spines strong, almost 3 × scutellum, proximal fifth whitish, central part black, apical fourth turning paler towards the tip, near the tip as pale as proximal section; spines turning upward, levelling out at one third from tip, spines diverging at an angle of 70°; spine with up to 25 strong black hairs with very small warts, apical bristle slightly more than half as long as spine; thorax dorsally with long strong hairs, arranged in rows, no distinct bristles present, scutellum with six pairs of strong hairs dorsally and six pairs laterally, pleurae with long white hairs.

Wing: basal quarter hyaline except for base of axillary cell; rest of wing covered with dark microchaetae; spots covered with fewer and paler microchaetae except for proximal anterior spot of which anterior half is hyaline; at one third from base an anterior spot in marginal cell, continuing through first basal cell and ending much narrower in second basal cell, a posterior spot in third posterior cell; in centre of wing an anterior spot in marginal and submarginal cells, not touching the third vein, and a posterior spot at base of second posterior cell; apical sixth of wing paler, bordered by three subapical spots in submarginal, first posterior and second posterior cells; halteres white.

Legs: coxa 1, trochanter 1 and femur 1 dark brown, tibia 1 black, tarsus 1 slightly paler; other legs with same colour distribution, apical parts of femora somewhat darker; coxa 1 pollinose on inner side and proximal part of outer side, other coxae, trochanters and bases of femora with some pollinosity; F1 moderately incrassate with two rows of generally six tubercles on apical quarter, tiny apical spurs on F2 and F3; ventral side of all tarsi with yellowish pubescence, but less on tarsus 2; coxae and trochanters with white hairs, femora with long white hairs, tibiae and tarsi with short black hairs.

Abdomen: strongly clavate, syntergum (T1 + T2) slender but apically extended laterally, segment 3 3 × broader than syntergum, width of 4 and subsequent segments diminishing in turn; syntergum and tergite 3 blackish brown, rest of abdomen shining black; syntergum pollinose but for lateral sides and (sometimes) distal end, posterior edge of tergite 3 pollinose; long white hairs on lateral sides of syntergum (except for central section), lateral sides of tergite 3 and on whole of 4 and 5. Sternites brown with white pollinose bands along edges.

Genitalia: periandrium with about 28 strong hairs, covered with small hairs on posterior half; surstyli broad, spade like, with a number of smaller bristle-like hairs on lateral sides and small microchaetae on inner half; cerci long, slender covered with small hairs and a number of long hairs, apically some very long hairs; processus longi long slender; aedeagal apodeme of characteristic *Diopsina* type, anterior section relatively longer than in *draconigena* and *nitida*; ejaculatory apodeme rather slender, not becoming very broad anteriorly. Tergite 9 of ♀ covered with small hairs and some longer hairs, tergite 10 carries two pairs of bristle-like hairs, cerci of normal shape, subanal plate triangular, spermathecae round.

Habitat: this species has a rather hidden way of life, as probably all other *Diopsina*. After five years of extensive collecting in Malawi I first collected it (not more than two miles from my home) one month before I left. All specimens came from a small field with some tufts of higher grass near a river. The way to collect them was to poke around in tufts of high grass, after which they came out, crawling up along the stems.

D. kwaipai closely resembles *africana*. It can be distinguished by its blackish colour (*africana* is yellowish brown), the sculpture of the frons (*africana* has four depressions in front of the ocellar tubercle), the rows with six tubercles on F1 (*africana* five) and the stronger pleurotergal and scutellar spines. Small differences can also be found in the colour and pollinosity of the legs and in the colour pattern of the scutellar spines.

Diopsina nitida (Adams, 1903) Figs 1, 2c, 3c, 4d and 7

Teleopsis nitida Adams, 1903: 46
Diopsina nitida; Feijen, 1978: 23

Figures: van Bruggen, 1961, fig. 19

Type: ZIMBABWE, Salisbury; University of Kansas, Lawrence, Kansas.

Distribution: Zimbabwe, Nigeria, Zambia, Malawi.

Material examined: MALAWI, 1 ♂, Lifupa, Kasungu, 29.IX.1974. 2 ♂, Lifupa, 2.X.1974. 1 ♀, Bunda, 15.IV.1975. ZAMBIA, 1 ♂ Nangweshi, Zambesi bank, 21.VII.1952. NIGERIA, 1 ♂, Zaria, Samaru, 6.II.1970. 1 ♂, Zaria, 2.III.1970. The specimen from Zambia was examined by van Bruggen (1961) and identified as *D. ferruginea*.

As there is some puzzling variation in the material studied, I am not certain of the identification of all the material studied. Confirmation has to await study of larger series from more localities. I will, for the moment, not give a complete redescription, but will only indicate the more important characteristics (see also under *D. kaeleana* and *Diopsina* sp.).

Measurements: eyespan 2,9 mm (range 2,5–3,1 mm), length of body 4,5 mm (range 4,3–4,8 mm), length of wing 3,2 mm (range 3,0–3,4 mm), length of scutellar spine 0,7 mm (range 0,6–0,8 mm). Adams' type (eyestalk 8 mm means 0,8 mm) is a rather small specimen.

Head: dark brown with the apical ends of stalks black; two depressions in front of ocellar tubercle and a pair of depressions more laterally of tubercle (some variation however occurs), facial teeth small, but distinct; IOB long, on strong tubercle; OOB shorter, on small tubercle; central section of head with whitish hairs, stalks with rows of short, black more bristle-like hairs (especially in Bunda specimen).

Thorax: brown and pollinose in the Lifupa males, but shining brown in other specimens, scutellum pollinose dorsally; this difference in pollinosity is quite remarkable (in the large *apicalis* complex of the genus *Diopsis* even very small differences in pollinosity of the thorax are clear indications of different species); Adams described thorax and scutellum as 'shining', but this is incorrect as the

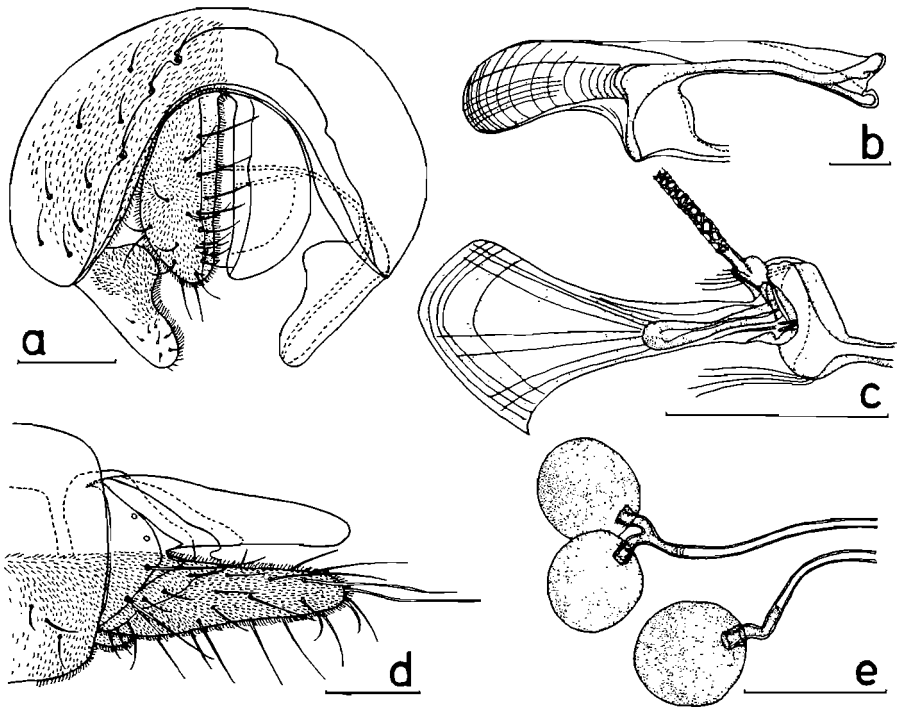

Fig. 7. Genitalia of *Diopsina nitida*. a. Hypopygium. b. Aedeagal apodeme. c. Ejaculatory apodeme. d. Female cerci. e. Spermathecae. (♂ from Lifupa, Malawi, ♀ from Bunda, Malawi). Scales 0,1 mm.

type, though rather damaged, clearly shows pollinosity; scutellar spines with proximal and apical third whitish and central section dark, distinction between dark and white sections being clearest in this species; two pairs of dorsolateral bristles are always present (SA and IA) and 1 or 2 pairs of dorsocentral bristles; scutellum has 1 or 2 pairs of discal bristles, scutellar spines have, except for apical bristle, up to eight small bristle-like hairs originating from clear warts.

Wing: proximal anterior spot characteristically does not continue into second basal cell; a vague spot occurs in proximal section of axillary cell, paler apical section of wing larger than in other species.

Legs: specimens from Malawi and Zambia have rows of about 7 tubercles on F1, flies from Nigeria 8 to 9 tubercles, with a space between first and subsequent tubercles.

Abdomen: pollinosity on abdomen very characteristic and constant; first small tergite pollinose, anterior section of tergite 2 pollinose except for most proximal lateral part, distal edges of tergites 2 and 3 pollinose, two pollinose spots present on proximal section of tergite 3.

Genitalia: periandrium with about eleven pairs of medium sized hairs, covered with microchaetae except for lateral and anterior margins; surstyli with a broad hump in middle, covered with microchaetae on inner side and with some sparse,

slightly stronger hairs near tip; processus longi very slender; aedeagal apodeme of characteristic *Diopsina* shape; ejaculatory apodeme much broader anteriorly, somewhat fan shaped. No differences could be found between male genitalia of material from Zambia, Malawi and Nigeria, but studies of larger series might be useful. Tergite 9 of ♀ covered with microchaetae, tergite 10 has two pairs of bristle-like hairs, cerci rather slender, subanal plate pentagonal with rounded corners, spermathecae round.

Habitat: Lifupa flies were collected under a tree near a stream amid large numbers of other diopsids, the Bunda fly was collected in high grass and the Zambia specimen on a bank of the Zambesi.

Feijen (1978) gave *kaeleana* as a synonym of *nitida*, but as there are now more '*nitida*-like' *Diopsina* known to occur (see under *Diopsina* sp.) this statement requires reconsideration.

D. nitida is characterised by its medium-sized build, dark colour, presence of small facial teeth, strong base of IOB, absence of presutural (or NP) bristles, presence of 1 pair of SA, 1 pair of IA, 1 or 2 pairs of DC and 1 or 2 pairs of discal bristles, wings with no continuation of the proximal anterior spot into the second basal cell, two pollinose spots on the third tergite, typical surstyli and round spermathecae.

Diopsina schulteni Feijen, 1978

Diopsina schulteni Feijen, 1978: 20

Figures: Feijen, 1978, fig. 1c, 2c and 3c.

Type: TOGO, Sokodé; in the Staatlichen Museum für Naturkunde, Stuttgart, Germany.

Distribution: Togo.

This species is easily distinguished by its small build, F1 with rows of 10 tubercles, baldness, small pleurotergal and scutellar spines, glossy brown colour, absence of FT and absence of thoracic bristles (except for the apical bristle on the scutellar spines). Its genitalia are not yet described. In the original description a mistake was made in the description of the scutellar spines: 'distal half whitish' should be 'proximal half whitish' (the same lapse occurred in the description of *Diasemopsis jillyi*).

Diopsina sp. Fig. 8

Material examined: NIGERIA, 1 ♀, Zaria, Samaru, 27.II.1970.

Although this female originates from the same location as the two males treated under *nitida* and is very similar to *nitida*, I prefer to treat it for the moment as a separate species as it is clearly aberrant in various aspects. The first femur has two rows of ten tubercles with a clear space between the first tubercle and the others. In *nitida* the number of tubercles is about 7, although it was higher (8–9) in the males from Nigeria. On the abdomen the female has two pollinose spots on tergite 3 as in *D. nitida*, but it also has a broad pollinose band on the posterior end of tergite 3, continuing on tergite 4, running out posteriorly

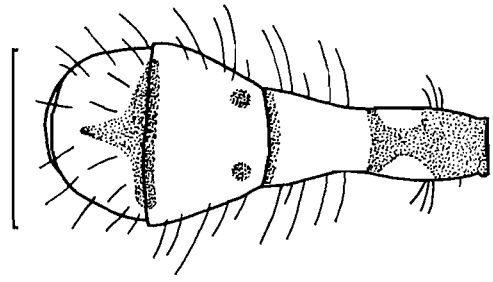

Fig. 8. Dorsal view of abdomen of *Diopsina* sp. from Zaria, Nigeria. Scale 1 mm.

into a central point (Fig. 8). The males from Zaria certainly do not show this feature. The genitalia of this female are also different from the genitalia of *nitida* from Malawi. Instead of two pairs of long hairs on tergite 10, there is only one pair. The number of long hairs on this tergite can in some groups of the genus *Diopsis* be used to distinguish species (they are often even typical for genera).

A note on the genus *Cyrtodiopsis* Frey, 1928.

Feijen (1978) mentioned the possibility of synonymy of the genera *Diopsina* and *Cyrtodiopsis*. But as I had at that time not yet studied any *Cyrtodiopsis* I had to leave that question unanswered. I have now examined several Asian *Cyrtodiopsis* and one species from Madagascar, included by Steyskal (1972) in *Cyrtodiopsis*. These studies leave no doubt about *Cyrtodiopsis* and *Diopsina* being clearly distinct genera. *Cyrtodiopsis* is a genus of diopsids of much larger and more slender build, the eyestalks are relatively much longer. The IOB and OOB are much finer and apical bristles on the scutellar spines never seem to be present. FT are never present. The scutellum is completely different in form, smaller and not deeper than long. The spines are much stronger than in *Diopsina* ($> 3 \times$ scutellum), unicoloured and differently curved. The F1 has long rows of tubercles over more than half its length and often has a particular shape apically. The wing has a third median spot in the first posterior cell. The genitalia are very different from those in *Diopsina* (Fig. 9). The periandrium has a completely different broadly rounded shape and is completely covered with microchaetae, the surstyli are strongly built and more hairy, the processus longi linking the surstyli is lacking. The anterior section of the aedeagal apodeme is much longer, the vane smaller and the typical central configuration found in *Diopsina* is lacking. The ejaculatory sac is relatively much smaller. On the tenth female tergite one pair of long hairs is present and on the cerci 1 or 2 pairs of hairs are much longer and darker than the others (as in *Diasemopsis*). The spermathecae have small, tooth-like processes.

The similarity in wing pattern between *Diopsina* and *Cyrtodiopsis* is remarkable. However, this pattern is not only found in these two genera but also in *Teleopsis*, *Eurydiopsis subnotata* and the Madagascar '*Cyrtodiopsis*'. It seems unlikely that the same wing pattern developed independently in five different genera. On the other hand these genera are, in many aspects very different and

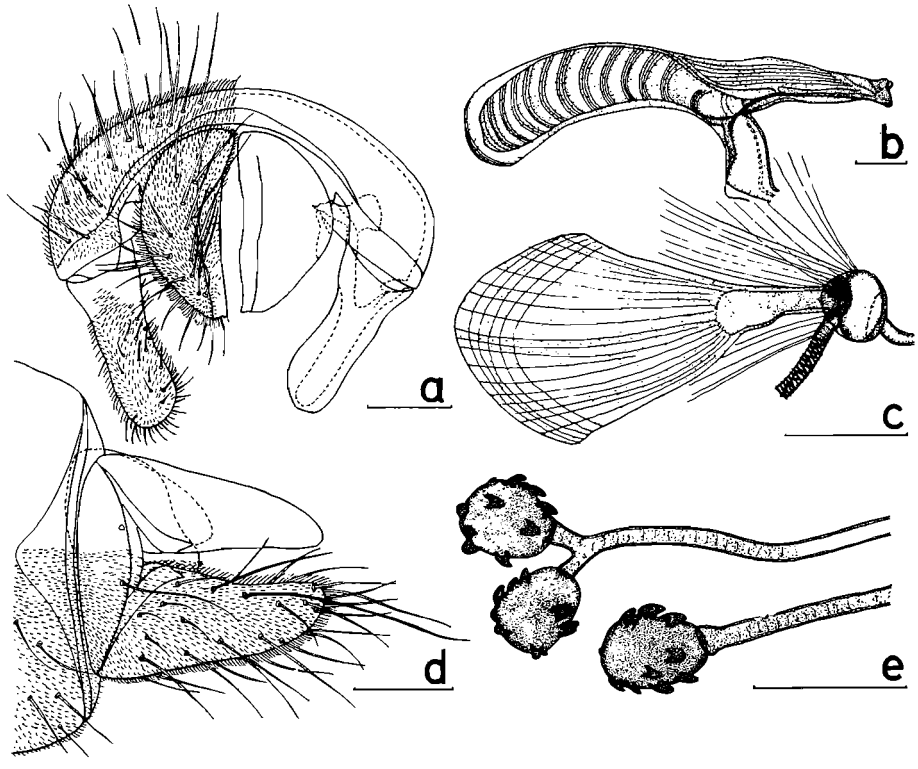

Fig. 9. Genitalia of *Cyrtodiopsis* species near *dalmanni*. a. Hypopygium. b. Aedeagal apodeme. c. Ejaculatory apodeme. d. Female cerci. e. Spermathecae (♂ from Niki, Thailand, ♀ from Miri, Sarawak—♂ and ♀ are not necessarily conspecific). Scales 0,1 mm.

share independently characteristics with some other diopsid genera. Ornamented spermathecae are, for instance, found in *Diasemopsis*, *Teleopsis* and *Cyrtodiopsis* (see also Tan, 1967 and Tenorio, 1969). Many more Diopsidae have to be studied (especially the genitalia) before their phylogeny can be presented. Hennig's (1965) work on phylogeny in Diopsidae did not take into consideration the genitalia and mainly centred on developments between *Centrioncus* (not a diopsid at all), *Prosphyracephala*, *Sphyracephala*, *Pseudodiopsis* (= *Sphyracephala*) and, for convenience, all other genera taken together in a '*Diopsis*-gruppe'. The phylogenies presented by Steyskal (1972) and Shillito (1971) are mainly converted typological keys and especially in Steyskal's case wrong in many aspects.

For the comparison between *Diopsina* and *Cyrtodiopsis* I studied *Cyrtodiopsis* material from Thailand, Malaysia, Sarawak, Sumatra and Java. Using the genitalia I could distinguish three species all of which, using Shillito's (1940) key, keyed out as *Cyrtodiopsis dalmanni*. In Fig. 9 I illustrate the male genitalia closest to those given by Tan (1967) as belonging to *C. dalmanni*. It is doubtful that *C. dalmanni* is as widespread a species as proposed by Shillito. It also remains to be seen whether all the species mentioned as its synonyms should be considered as such.

Of the Madagascar '*Cyrtodiopsis*' I was able to examine *Cyrtodiopsis vadoni*. In 1972 Steyskal included *Eurydiopsis anjahanaribei*, *E. vadoni*, *Diopsis apollo* and *Diopsis* (*Eurydiopsis*) *apographica* in the genus *Cyrtodiopsis*. Shillito (1971) indicated the necessity of erecting a second Malagasy genus for these four species, which he tentatively placed in *Eurydiopsis* S. & V. nec Frey. Later (Cogan & Shillito, 1980) he agreed however to their inclusion in *Cyrtodiopsis*. The hypopygia of the four species are illustrated by Seguy (1949) and Vanschuytbroek (1965) and show quite similar structures (the hypopygium of *vadoni* is represented in a somewhat strange way). All have a long strong apophysis on the surstyli, which is not found in *Cyrtodiopsis*. A brief examination of *vadoni* shows that it is clearly not a *Cyrtodiopsis*. It is for instance completely bald. It is strange that Steyskal included *vadoni* in *Cyrtodiopsis*, as in his key he stated (for *Cyrtodiopsis*) 'body and scutellar spines furnished with long erect setulae'. Shillito's original idea that a second exclusively Malagasy genus has to be created for these four species is correct.

ACKNOWLEDGEMENTS

I am indebted to Dr B. R. Stuckenberg and Dr J. G. H. Londt for placing the Diopsidae collection of the Natal Museum at my disposal. My research on Diopsidae in Malawi was supported by a grant from WOTRO (Netherlands Foundation for the Advancement of Tropical Research). I am grateful to my wife for assistance with the preparation of the manuscript.

ADDENDUM

Examination of the type of *Phryxodiopsis kaeleana* revealed the same configuration of pollinosity on the abdomen as in *Diopsina* sp. (Fig. 8). *D. kaeleana* can now be considered a valid species, distinct from *nitida*, and occurring in Cameroon, Senegal and Nigeria.

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Date received: 27 January 1981.